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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,498	06/24/2003	George A. Zimmerman	SLRFLR.0009P	3211

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EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/603,498	Applicant(s) ZIMMERMAN ET AL.	
	Examiner Walter F Briney III	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/6/05 and 1/16/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1-18 and 20-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Zerbe et al. (US Patent Application Publication 2004/0022311).**

Claim 1 is limited to a *transmit system*. Zerbe discloses a selectable-tap equalizer, depicted in figure 6. As shown in figure 6, a *transmitter* (154, mislabeled as 151) arranged at a *first station* (not shown) includes at least *two transmitters* (152₁) and (152₂). The two transmitters are each associated with one of *two channels* (122₁) and (122₂), respectively. The transmitters each include means for reducing far-end crosstalk and inter-symbol interference as will be shown, i.e. *configured to modify a data signal prior to transmission...to reduce the effects of coupling*. See paragraph 61.

With particular respect to the first transmitter (152₁), figure 6 clearly depicts receiving data on a first input labeled (TX DATA1). As stated in the previous paragraph, the transmitter includes means for reducing far-end crosstalk and inter-symbol interference. These means comprise elements (120₁), (121₁), (124₁), (131₁) and (153₁). Zerbe discloses in paragraph 57 that the shift registers (124₁) and (120₁) of the first transmitter (152₁) perform polarity control in order to generate a cancellation signal to

be presented at the second transmitter (152₂) for FEXT cancellation, as such, they correspond to *one or more filters*. Zerbe discloses in paragraphs 58-60 that cross-talk cancellation is provided by combining signals using multiplexers (153₁) and drivers (131₁). As can be seen from figure 6, outgoing signals from the second transmitter are coupled with the drivers (131₁) of the first transmitter (152₁), thus the drivers (131₁) correspond to *a device configured to combine one or more incoming cancellation signals with the data signal*. Because the cancellation drivers (131₁) and the main data driver (121₁) are all integral with the first transmitter (152₁), it is their combined output that forms the data signal transmitted on channel (122₁), thus, cancellation occurs *prior to transmission of the data signal*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 2 is limited to *the transmitter of claim 1*, as covered by Zerbe. As can be seen from figure 6, the data signal that is transmitted on channel (122₁) from the first transmitter (152₁) comprises an output from the main data driver (121₁) that is associated with a first output impedance and at least cancellation signal taken from one of the other drivers (131₁) that is associated with a second output impedance. Their arrangement clearly forms a voltage divider, where the voltage transmitted on channel (122₁) can be approximated as:

$$V_{\text{CHANNEL}} = (V_{\text{DATA}} - V_{\text{FEXT}}) * (Z_{\text{FEXT}} / (Z_{\text{FEXT}} + Z_{\text{DATA}})).$$

The term $(V_{\text{DATA}} - V_{\text{FEXT}})$ indicates that a subtractor forms the output. Therefore, Zerbe anticipates all limitations of the claim.

Claim 3 is limited to *the transmitter of claim 1*, as covered by Zerbe. As the filters (124₁) and (120₁) provide filtering prior to transmission and the subsequent coupling of far-end crosstalk, they correspond to *precode FEXT filters*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 4 is limited to *the transmitter of claim 3*, as covered by Zerbe. As seen in figure 6, the second transmitter (152₂) includes two shift registers (124₂) and (120₂) that perform the same functions as *digital precode FEXT filters* (124₁) and (120₁). As disclosed in paragraph 62 of Zerbe, any number of FEXT cancellation signals are received from any number of transmitters, thus, *a filter is associated with each of the other transmitters in the transmit system*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 5 is limited to *the transmitter of claim 1*, as covered by Zerbe. The filters discussed in the rejection of claim 3 are intended to generate FEXT cancellation signals, and thus correspond to *precode filters configured to cancel FEXT coupling*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 6 is limited to *the transmitter of claim 1*, as covered by Zerbe. Zerbe discloses that each cancellation driver (131₁) of the first transmitter (152₁) include an input multiplexer for selecting between crosstalk cancellation signal taps and equalization taps. See paragraphs 58-60. All taps of shift registers (124₁) and (120₁) that are used for equalization correspond to a *transmit precode filter*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 7 is limited to a *coupling precode filter system*. In general, the system of claim 7 is essentially the same as the system of claim 1, as covered by Zerbe. For clarity, each system element will be drawn to its corresponding element in Zerbe. Figure 6 of Zerbe includes inputs for signals (TX DATA1) and (TX DATA2), which correspond to the *first input, first signal* and *second input, second signal*, respectively. Shift registers (124₁) and (120₁) correspond to the *first filter*. Shift register (124₂) and (120₂) correspond to the *second filter*. Cancellation drivers (131₁) and (131₂) correspond to the *first* and *second devices*, respectively. Therefore, Zerbe anticipates all limitations of the claim.

Claim 8 is limited to the *coupling precode filter system of claim 7*, as covered by Zerbe. Clearly, the shift registers (124_i) and (120_i) form respective pre and past data buffers. Zerbe discloses in paragraph 62 that crosstalk is performed using pre and past data taps from all transmitters. The presence of pre-tap data indicates that the filters are non-causal. Therefore, Zerbe anticipates all limitations of the claim.

Claim 9 is limited to the *coupling precode filter system of claim 7*, as covered by Zerbe. As shown in the rejections of claims 1, 4 and 6, each transmitter includes a *digital precode FEXT filter* and a *transmit precode filter*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 10 is limited to the *coupling precode filter system of claim 7*, as covered by Zerbe. As shown in the rejection of claim 2, the cancellation drivers (131_i) correspond to *subtractors*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 11 is limited to the *coupling precode filter system of claim 7*, as covered by Zerbe. Zerbe discloses in paragraph 62 that the system illustrated therein is not limited to a two-channel system as depicted in figure 6, but any number of transmitters, including a four-channel system including four-transmitters, i.e. *third and fourth transmitters*, and at least one transmitter for each filter. Therefore, Zerbe anticipates all limitations of the claim.

Claim 12 is limited to *a method for use in a multi-channel communication system having two or more transmitters*. It is submitted that the method of claim 12 is inherently performed by the systems recited in either of claims 6 or 9, as covered by Zerbe, and is rejected for the same reasons.

Claim 13 is limited to *the method of claim 12*, as covered by Zerbe. As shown in the rejection of claim 4, the shift registers (124_i) and (120_i) correspond to digital precode FEXT filters. Therefore, Zerbe anticipates all limitations of the claim.

Claim 14 is limited to *the method of claim 12*, as covered by Zerbe. As shown in the rejection of claim 9, the shift registers (124_i) and (120_i) correspond to digital precode transmit filters. Therefore, Zerbe anticipates all limitations of the claim.

Claim 15 is limited to *the method of claim 12*, as covered by Zerbe. As shown in the rejection of claim 11, the system disclosed by Zerbe includes any number of transmitters, including four, where each is assigned to a separate channel (122_i). Therefore, Zerbe anticipates all limitations of the claim.

Claim 16 is limited to *the method of claim 12*, as covered by Zerbe. Zerbe discloses that cancellation signals from all transmitters affected by FEXT are routed to

each other to reduce the effects of FEXT. See paragraphs 58-62. The cancellation driver (131₁) serves to combine signals received from all other transmitters at the first transmitter. Therefore, Zerbe anticipates all limitations of the claim.

Claim 17 is limited to *the method of claim 12*, as covered by Zerbe. As shown in the rejection of claim 2, the cancellation drivers correspond to subtractors, i.e. *combining comprises subtracting the cancellation signal from the second signal*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 18 is limited to *a method of FEXT cancellation in a four-channel communication system*. As shown in the rejection of claim 11, the system disclosed by Zerbe is not limited in the number of channels supported by the transmitting station (154), but includes any number of channels, each associated with a cancellation signal generated by a filter and a combiner for removing FEXT. See paragraph 62. Also note that since each tap of shift registers (124₁) and (120₁) are accessible for FEXT cancellation, each tap also corresponds to a separate filter, able to generate *second third and fourth transmitter cancellation signals* in accordance with the crosstalk cancellation needs of each of the *second, third, and fourth transmitters*, respectively. Therefore, Zerbe anticipates all limitations of the claim.

Claim 20 is limited to *the method of claim 18*, as covered by Zerbe. As shown in the rejection of claim 18, each tap of each shift register corresponds to a filter. It follows that each pair of transmitters will also require different taps to generate the same degree of cancellation based on the amount of FEXT coupling that occurs between each pair. For example, if the first and second transmitter are closer than the first and

third transmitter, it follows that the first and second would experience greater coupling than the first and third transmitter. Thus, the first and second would share more taps in order to generate a more accurate cancellation signal. Therefore, Zerbe anticipates all limitations of the claim.

Claim 21 is limited to *the method of claim 18*, as covered by Zerbe. Zerbe discloses in paragraph 62, receiving cancellations signals from each transmitter of the system and combining them with the outgoing data signal using drivers (131₁). Therefore, Zerbe anticipates all limitations of the claim.

Claim 22 is limited to *the method of claim 18*, as covered by Zerbe. Zerbe discloses performing equalization as well as FEXT cancellation using the shift register taps. See paragraphs 58-60. Therefore, Zerbe anticipates all limitations of the claim.

Claim 23 is limited to *the method of claim 18*, as covered by Zerbe. Clearly, the shift registers (124_i) and (120_i) are digital, and correspond to *digital filters*. Therefore, Zerbe anticipates all limitations of the claim.

Claim 24 is limited to *the method of claim 23*, as covered by Zerbe. Zerbe discloses in paragraphs 58-60 using the filters to remove FEXT, which inherently removes ELFEXT because FEXT and ELFEXT are simply two different ways of measuring the same phenomenon. Therefore, Zerbe anticipates all limitations of the claim.

Claims 25, 26, and 28 are essentially the same as claims 1, 2, and 4, as covered by Zerbe, respectively, and are rejected for the same reasons.

Claim 27 is essentially the same as claim 6, as covered by Zerbe. In addition, Zerbe discloses that equalizers reduce *inter-symbol interference* in paragraph 2, thus, those shift register taps used for equalization also perform reduction in *inter-symbol interference*. Therefore, Zerbe anticipates all limitations of the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zerbe et al. (US Patent Application Publication 2004/0022311).**

Claim 19 is limited to *the method of claim 18*, as covered by Zerbe. Zerbe simply discloses a general digital data transmission system with no relation to a specific transmission protocol. Therefore, Zerbe anticipates all limitations of the claim with the exception *wherein the communication system operates based on an Ethernet standard*.

The examiner takes Official Notice of the fact that the Ethernet standard was a well-known digital data standard at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the invention to transmit data using the Ethernet standard as was well-known in the art because Ethernet was well established, and provides fast and robust data transfer over long distances.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**SINH TRAN
SUPERVISORY PATENT EXAMINER**

WFB
4/26/05